

## **CLAIM AMENDMENTS**

Claim 1 (Original). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises:

- a) a detachable sole;
- b) a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot;
- c) a plantar pressure collecting unit positioned between a plantar side of said user's foot and the detachable sole;
- d) a rearfoot motion collection unit having at least one accelerometer sensor and at least one rate sensor;
- e) a lower shank motion collection unit having at least one accelerometer sensor and at least one rate sensor;
- f) a detachable processing unit in electrical communication with the plantar pressure collection unit, the rearfoot motion collection unit, and the lower shank motion collection unit, said detachable processing unit for processing data from a plurality of said accelerometers and said sensors; and
- g) a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 2 (Original). The portable human gait analysis apparatus of claim 1, wherein said soft casing unit is sized to fit within a user's shoe, with the rearfoot motion collection unit, the lower shank motion unit, and the processing and display unit attached to the outer portion of the user's shoe.

Claim 3 (Original). The portable human gait analysis apparatus of claim 1, wherein independent measurements are taken for said user's right foot and left foot, and said processing and display units function independently of each foot.

Claim 4 (Original). The portable human gait analysis apparatus of claim 1, wherein past data is stored in memory, and processed by the central processing unit for comparison between use.

Claim 5 (Original). The portable human gait analysis apparatus of claim 1, wherein the display unit is a LCD display unit.

Claim 6 (Original). The portable human gait analysis apparatus of claim 1, wherein the data from the central processing unit passes through an I/O unit to a telemetry unit for transfer to at least one of a PC and PDA, for storage and further analysis.

Claim 7 (Original). The portable human gait analysis apparatus of claim 6, wherein the data from the telemetry unit is transferred to at least one of: a walkman, a TV, a VCR, a DVD player, a CD player, a projection unit, a game console, a stereo and an internet site for entertainment purposes.

Claim 8 (Previously Amended). The portable human gait analysis apparatus of claim 1, wherein the central processing unit processes data from the plurality of accelerometers and

sensors to determine pronation, supination and normal data based upon data received from the rearfoot motion collection unit and lower shank motion collection unit.

Claim 9 (Original). The portable human gait analysis apparatus of claim 1, wherein a user's body weight is calibrated by the central processing unit to provide a baseline for processing data.

Claim 10 (Original). The portable human gait analysis apparatus of claim 1, wherein the detachable sole is flexible, durable, electrically insulating, and resilient.

Claim 11 (Original). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises:

- a) a detachable sole which is flexible, durable, electrically insulating, and resilient;
- b) a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot;
- c) a plantar pressure collection unit positioned between a plantar side of said users foot and the detachable sole, to identify the center of pressure line and excessive and abnormal loads on the sole of the foot;
- d) a rearfoot motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to calculate rearfoot kinematic data crucial to identify the motions of pronation and supination;

- e) a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, which when combined with data from the rearfoot kinematic data, to provide three dimensional static and dynamic acceleration, angular velocity, two-axis tilt information, and static and dynamic foot movements;
- f) a detachable processing unit in electrical communication with the plantar pressure collection unit, the rearfoot motion collection unit, and the lower shank motion collection unit, said detachable processing unit for processing data from said accelerometers and said plurality of sensors; and
- g) a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 12 (Currently Amended). The portable human gait analysis apparatus of claim 11, wherein the plantar pressure collection unit positions force sensor resistors and pressure sensors along a first phalange, a second phalange, a third phalange, a fourth phalange in the forefoot, along a first metatarsal head, a second metatarsal head, and a fourth metatarsal head in the forefoot, along a first metatarsal base, a fourth metatarsal base and a fifth metatarsal base in the midfoot, underneath a distal portion of a medial and lateral side of a calcaneus in the midfoot, and at the medial and lateral surfaces of the calcaneus in the rearfoot, to provide accurate measurement of maximum pressure, mean pressure, and the center of pressure line.

Claim 13 (Original). The portable human gait analysis apparatus of claim 11 wherein the information displayed on the processing and display unit comprises vital gait information,

including over-pronate, supinate, and neutral plantar pressure distribution and the amount of eversion/inversion angle.

Claim 14 (Original). The portable human gait analysis apparatus of claim 11, wherein the processing and display unit provides a color coded mapping data, which has been normalized by body weight calibration.

Claim 15 (Previously Amended). The portable human gait analysis apparatus of claim 11, wherein said soft casing unit is sized to fit within a user's shoe, with the rearfoot motion collection unit, the lower shank motion unit, and the processing and display unit attached to the outer portion of the user's shoe.

Claim 16 (Previously Amended). The portable human gait analysis apparatus of claim 11, wherein independent measurements are taken for said user's right foot and left foot, and said processing and display units function independently of each foot.

Claim 17 (Previously Amended). The portable human gait analysis apparatus of claim 11, wherein past and current data is stored in memory, and processed by the central processing unit for comparison between use.

Claim 18 (Previously Amended). The portable human gait analysis apparatus of claim 11, wherein the display unit is a LCD display unit.

Claim 19 (Previously Amended). The portable human gait analysis apparatus of claim 11, wherein the data from the central processing unit passes through an I/O unit to a telemetry unit for transfer to at least one of a PC and PDA, for storage and further analysis.

Claim 20 (Previously Amended). The portable human gait apparatus of claim 19, wherein the data from the telemetry unit is transferred to at least one of: a walkman, a TV, a VCR, a DVD player, a CD player, a projection unit, a game console, a stereo and an internet site for entertainment purposes.

Claim 21 (Original). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises:

- a) a detachable sole which is flexible, durable, electrically insulating, and resilient;
- b) a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot;
- c) a plantar pressure collection unit positioned between a plantar side of said user's foot and the detachable sole, to identify the center of pressure line and excessive and abnormal loads on the sole of the foot;
- d) a rearfoot motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to calculate rearfoot kinematic data crucial to identify the motions of pronation and supination;
- e) a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, which when combined with data from the rearfoot kinematic data, provides three dimensional

static and dynamic acceleration, angular velocity, 2-axis tilt information, and static and dynamic foot movements;

- f) a detachable processing unit in electrical communication with the plantar pressure collection unit, the rearfoot motion collection unit, and the lower shank motion collection unit, said detachable processing unit for processing data from said accelerometers and said plurality of sensors, which has been normalized by body weight and calibration; and
- g) an LCD visual display unit in electrical communication with the detachable processing unit for displaying the data comprises vital gait information, including over-pronate, supinate, and neutral plantar pressure/distribution and the amount of eversion/inversion angle of the user's foot.

Claim 22 (Previously Amended). The portable human gait analysis apparatus of claim 21, wherein the plantar pressure collection unit positions force sensor resistors and pressure sensors along a first phalange, a second phalange, a third phalange, a fourth phalange in the forefoot, along a first metatarsal head, a second metatarsal head, and a fourth metatarsal head in the forefoot, along a first metatarsal base, a fourth metatarsal base and a fifth metatarsal base in the midfoot, underneath a distal portion of a medial and a lateral side of a calcaneus in the midfoot, and at the medial and lateral surfaces of the calcaneus in the rearfoot, to provide accurate measurement of maximum pressure, mean pressure, and pressure line.

Claim 23 (Previously Amended). The portable human gait analysis of claim 21, wherein independent measurements are taken for said user's right foot and left foot, and said processing and display units function independently for each foot.

Claim 24 (Currently Amended). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a plantar pressure ~~collection~~ collection unit positioned between a plantar side of said user's foot and the detachable sole, a rearfoot motion collection unit having at least one accelerometer sensor and at least one rate sensor, a detachable processing unit in electrical communication with the plantar pressure collection unit, said detachable processing unit being configured for processing data from the plantar pressure collection unit, said detachable processing unit further being in electrical communication with said rearfoot motion collection unit, said processing unit being further configured for processing data from at least one accelerometer sensor and said at least one rate sensor, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 25 (Canceled).

Claim 26 (Previously Presented). The portable human gait analysis apparatus of claim 24 further comprising a lower shank motion collection unit having at least one accelerometer sensor and at least one rate sensor, said detachable processing unit further being in electrical



communication with said lower shank motion collection unit and further being configured for processing data from said at least one accelerometer sensor and said at least one rate sensor.

Claim 27 (Previously Presented). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a rearfoot motion collection unit having at least one accelerometer sensor and at least one rate sensor, a detachable processing unit in electrical communication with the rearfoot motion collection unit, said detachable processing unit being configured for processing data from said at least one accelerometer sensor and said at least one rate sensor, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 28 (Previously Presented). The portable human gait analysis apparatus of claim 27 further comprising a lower shank motion collection unit having at least one accelerometer sensor and at least one rate sensor, said detachable processing unit being further in electrical communication with said lower shank motion collection unit and being further configured for processing data from said at least one accelerometer sensor and said at least one rate sensor of said lower shank motion collection unit.

Claim 29 (Previously Presented). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole, a soft casing

unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a lower shank motion collection unit having at least one accelerometer sensor and at least one rate sensor, a detachable processing unit in electrical communication with the lower shank motion collection unit, said detachable processing unit being configured for processing data from said at least one accelerometer and said at least one rate sensor, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 30 (Currently Amended). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole which is flexible, durable, electrically insulating, and resilient, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a plantar pressure collection unit positioned between a plantar side of said user's foot and the detachable sole, to identify the center of pressure line and excessive and abnormal loads on the sole of the foot, a detachable processing unit in electrical communication with the plantar pressure collection unit, said detachable processing unit being configured for processing data from said plantar pressure collection unit, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit, a rearfoot motion collection unit having at

least one accelerometer sensor and a plurality of rate sensors to calculate rearfoot kinematic data crucial to identify the motions of pronation and supination, said detachable processing unit further being in electrical communication with the rearfoot motion collection unit, said detachable processing unit being further configured for processing data from said at least one accelerometer sensor and said plurality of rate sensors.

Claim 31 (Canceled).

Claim 32 (Previously Presented). The portable human gait analysis apparatus of claim 30 further comprising a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, said detachable processing unit further being in electrical communication with the lower shank motion collection unit and further being configured for processing said lower shank motion data from said at least one accelerometer sensor and said plurality of rate sensors.

Claim 33 (Previously Presented). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole which is flexible, durable, electrically insulating, and resilient, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a rearfoot motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to calculate rearfoot kinematic data crucial to identify the motions of pronation and supination, a detachable processing unit in electrical communication with the rearfoot motion collection unit, said detachable processing

unit being configured for processing said rearfoot kinematic data from said at least one accelerometer sensor and said plurality of rate sensors, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 34 (Previously Presented). The portable human gait analysis apparatus of claim 33 further comprising a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, which when combined with data from the rearfoot kinematic data, to provide three dimensional static and dynamic acceleration, angular velocity, 2-axis tilt information, and static and dynamic foot movements, said detachable processing unit further being in electrical communication with the lower shank motion collection unit and configured for processing said lower shank motion data from said at least one accelerometer sensor and said plurality of rate sensors from said lower shank motion collection unit.

Claim 35 (Previously Presented). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole which is flexible, durable, electrically insulating, and resilient, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, a detachable processing unit in electrical communication with the lower shank motion collection

unit, said detachable processing unit being configured for processing said lower shank motion data from said at least one accelerometer sensor and said plurality of rate sensors, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 36 (Currently Amended). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole which is flexible, durable, electrically insulating, and resilient, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a plantar pressure collection unit positioned between a plantar side of the user's foot and the detachable sole, to identify the center of pressure line and excessive and abnormal loads on the sole of the foot, a detachable processing unit in electrical communication with the plantar pressure collection unit, said detachable processing unit for processing data from said plantar pressure collection unit, said data being normalized by body weight calibration, and an LCD visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit, and the information displayed comprising vital gait information comprising over-pronate, ~~suponate~~ supinate, and neutral plantar pressure/distribution and the amount of eversion/inversion angle of the user's foot.

Claim 37 (Currently Amended). The portable human gait analysis apparatus of claim 36 further comprising a rearfoot motion collection unit having at least one accelerometer sensor and

a plurality of rate sensors to calculate rearfoot kinematic data crucial to identify the motions of pronation and ~~supination~~ supination, said detachable processing unit further being in electrical communication with the rearfoot motion collection unit and being further configured for processing said rearfoot kinematic data from said at least one accelerometer sensor and said plurality of rate sensors, said rearfoot kinematic data further being normalized by body weight calibration.

Claim 38 (Previously Presented). The portable human gait analysis apparatus of claim 36 further comprising a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, said detachable processing unit further being in electrical communication with the lower shank motion collection unit and further configured for processing said lower shank motion data from said at least one accelerometer sensor and said plurality of rate sensors, said lower shank motion data further being normalized by body weight calibration.

Claim 39 (Currently Amended). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole which is flexible, durable, electrically insulating, and resilient, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a rearfoot motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to calculate rearfoot kinematic data crucial to identify the motions of pronation and supination, a detachable processing unit in

electrical communication with the rearfoot motion collection unit, said detachable processing unit configured for processing said rearfoot kinematic data from said at least one accelerometer sensor and said plurality of rate sensors, which have been normalized by body weight calibration, and an LCD visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit, and the information displayed comprising vital gait information comprising over-pronate, ~~suponate~~ supinate, and neutral plantar pressure/distribution and the amount of eversion/inversion angle of the user's foot.

Claim 40 (Currently Amended). The portable human gait analysis apparatus of claim 39 further comprising a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, which when combined with data from the rearfoot kinematic data, provides three dimensional static and dynamic acceleration, angular velocity, 2-axis tilt information, and static and dynamic foot movements, said detachable processing unit further being in electrical communication with the lower shank motion collection unit and further configured for processing said lower shank motion data from said at ~~last~~ least one accelerometer sensor and said plurality of rate sensors of said lower shank motion collection unit, which have been further normalized by body weight calibration.

Claim 41 (Currently Amended). A portable human gait analysis apparatus for releasable securement about the user's foot, wherein the apparatus comprises: a detachable sole which is flexible, durable, electrically insulating, and resilient, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank over, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the

detachable shank cover about said user's foot, a lower shank motion collection unit having at least one accelerometer sensor and a plurality of rate sensors to provide lower shank motion data, a detachable processing unit in electrical communication within the lower shank motion collection unit, said detachable processing unit being configured for processing said lower shank motion data from said at least one accelerometer sensor and said plurality of rate sensors, which have been normalized by body weight calibration, and an LCD visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit, and the information displayed comprising over-pronate, ~~suponate~~ supinate, and neutral plantar pressure/distribution and the amount of eversion/inversion angle of the user's foot.

Claim 42 (New). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a plantar pressure collection unit positioned between a plantar side of said user's foot and the detachable sole, said plantar pressure collection unit having four sensor resistors and pressure sensors along a first phalange, a second phalange, a third phalange, a fourth phalange in the forefoot, along a first metatarsal head, a second metatarsal head and a fourth metatarsal head in the forefoot, along a first metatarsal base, a fourth metatarsal base and a fifth metatarsal base in the midfoot, underneath a distal portion of a medial and lateral side of a calcaneus in the midfoot, and at the medial and lateral surfaces of a calcaneus in the rearfoot, to provide accurate measurement of



maximum pressure, mean pressure, and the center of pressure line, a detachable processing unit in electrical communication with the plantar pressure collection unit, said detachable processing unit being configured for processing data from the plantar pressure collection unit, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.

Claim 43 (New). A portable human gait analysis apparatus for releasable securement about a user's foot, wherein the apparatus comprises: a detachable sole which is flexible, durable, electrically insulating, and resilient, a soft casing unit having a detachable sole cover, a detachable foot cover, a detachable shank cover, and a releasable securement means for releasably and adjustably securing the detachable sole cover, the detachable foot cover, and the detachable shank cover about said user's foot, a plantar pressure collection unit positioned between a plantar side of said user's foot and the detachable sole, to identify the center of pressure line and excessive and abnormal loads on the sole of the foot, said plantar pressure collection unit having four sensor resistors and pressure sensors along a first phalange, a second phalange, a third phalange, a fourth phalange in the forefoot, along a first metatarsal head, a second metatarsal head and a fourth metatarsal head in the forefoot, along a first metatarsal base, a fourth metatarsal base and a fifth metatarsal base in the midfoot, underneath a distal portion of a medial and lateral side of a calcaneus in the midfoot, and at the medial and lateral surfaces of a calcaneus in the rearfoot, to provide accurate measurement of maximum pressure, mean pressure, and the center of pressure line, a detachable processing unit in electrical communication with the plantar pressure collection unit, said detachable processing unit being configured for processing

data from said plantar pressure collection unit, and a visual display unit in electrical communication with the detachable processing unit for displaying the data processed by the processing unit.